J. Helminthol. Soc. Wash.
61(2), 1994, pp. 200–204

A Redescription of *Telorchis auridistomi* (Digenea: Telorchiidae) with Comments on the Oral Sucker Papillae

E. V. FREIDENFELDS,[1] J. N. CAIRA,[1] AND B. CAMPBELL[2]

[1] Department of Ecology & Evolutionary Biology, The University of Connecticut, 75 N. Eagleville Rd., Storrs, Connecticut 06269-3043 and

[2] Ross University School of Veterinary Medicine, Basseterre, St. Kitts, West Indies

ABSTRACT: *Telorchis auridistomi* (Byrd, 1937) Wharton, 1940 is redescribed from type material, voucher specimens collected by Brooks (1979) from *Farancia abacura* (subspecies unspecified) in Florida, and newly collected voucher specimens from the small intestine of the western mudsnake, *F. a. reinwardti* in Louisiana. The redescription includes extension of the ranges of the measurements of all of the morphometric features of the species. A detailed illustration is presented to show the arrangement of the tegumental spines. The oral sucker of *T. auridistomi* was investigated with histological sections and scanning electron microscopy to resolve the discrepancies among descriptions of the number of oral sucker papillae in this species. Both techniques revealed the presence of only a single ventrolateral pair of papillae on the oral sucker of *T. auridistomi.* Examination of the holotype and 3 paratypes of *Telorchis dollfusi* (Stunkard and Franz, 1977) Wharton, 1940 confirmed the presence of only a single pair of papillae in this species as well. The key to species of *Telorchis* given by MacDonald and Brooks (1989) is emended to reflect this discovery.

KEY WORDS: *Farancia abacura, Telorchis auridistomi,* Telorchiidae.

Byrd (1937) originally described *Cercorchis auridistomi* from 1 complete and 2 partial specimens collected from *Farancia abacura* (Holbrook) from a canal in Harvey, Louisiana. Although the taxonomy of this species has been discussed subsequently in the literature (see Wharton, 1940; Stunkard and Franz, 1977; Stunkard, 1979) to our knowledge the only data added to this description were those of MacDonald and Brooks (1989) from 5 voucher specimens of the species. The discovery of numerous specimens of a digenean in the small intestine of the western mud snake, *Farancia abacura reinwardti* (Schlegel), provided us with the opportunity to redescribe this still poorly known telorchiid species. Particular attention was paid to the papillae associated with the oral sucker as there exists disagreement between Byrd's original description of this feature in this species (Byrd, 1937) and most of the subsequent references to the species (e.g., Stunkard and Franz, 1977; Stunkard, 1979; MacDonald and Brooks, 1989). In addition, the deposition of the type specimens of *C. auridistomi,* previously lost among Byrd's personal possessions and therefore unavailable to workers subsequent to Byrd, allowed us to confirm all details of the redescription with the original material.

Materials and Methods

Twenty-five specimens of the western mud snake, *Farancia abacura reinwardti,* were collected from St. John the Baptist Parish, Louisiana, in June of 1987. Digeneans were recovered from the small intestine of 22 of the snakes, fixed in alcohol/formalin/acetic acid (AFA) for 12 hr, and stored in 70% ethanol. Twenty specimens were stained with Gill's hematoxylin, cleared in xylene, and mounted in Canada balsam as whole mounts according to conventional techniques. Five specimens were embedded in paraplast (Sherwood Medical Industries, St. Louis, Missouri), sectioned at 10 μm, stained in hematoxylin and eosin, and mounted in Canada balsam according to conventional techniques. Three specimens were dried for scanning electron microscopy as follows: specimens were hydrated, transferred to 1% osmium tetroxide overnight, dehydrated in an ethanol series, transferred to a 1:1 mixture of Peldri II (Ted Pella, Inc., Redding, CA) and absolute alcohol at 25°C on a slide warmer for 1 hr, transferred to 100% Peldri II at 25°C on a slide warmer for 1 hr, and transferred to a well slide filled with 100% Peldri II on a petri dish that had been cooled in the freezer and left overnight in a fume hood to sublimate. Specimens were mounted on stubs with silver paint, sputter coated with 100 Å of gold, and examined with a Coates and Welter Field Emission scanning electron microscope. The line drawing was done with the aid of a drawing tube. Sections were photographed with an Olympus PM-10AD camera system. Measurements are given in micrometers in the text as range followed in parentheses by the mean, the standard deviation, the number of worms examined (n), and the number of measurements taken (*n*) when more than 1 measurement was made per worm. In addition to the material of *Telorchis auridistomi* listed below, for comparative purposes, 1 slide containing both the holotype (AMNH 872) and 3 paratypes (AMNH 873) of *Paratelorchis dollfusi* Stunkard & Franz, 1977 (=*Telorchis dollfusi* (Stunkard & Franz, 1977) MacDonald and Brooks, 1989) was borrowed from the American Museum of Natural History.

***Telorchis auridistomi* (Byrd, 1937) Wharton, 1940 (Figs. 1-5)**

SYNONYMS: *Cercorchis auridistomi* Byrd, 1937; *Paratelorchis auridistomi* (Byrd, 1937) Stunkard & Franz, 1977; *Auritelorchis auridistomi* (Byrd, 1937) Stunkard, 1979.

MATERIAL EXAMINED: Holotype of *C. auridistomi* (U.S. National Museum Helminthology Collection, Beltsville, Maryland, USNM 80696); 1 paratype of *C. auridistomi* (The Harold W. Manter Laboratory of Parasitology, University of Nebraska State Museum, Lincoln, Nebraska, HWML 31103); 10 voucher specimens of *P. auridistomi* (HWML 20896); 20 voucher specimens *T. auridistomi* (HWML 37545); sections of *T. auridistomi* (HWML 37545).

HOSTS AND LOCALITIES: *Farancia abacura,* Harvey, Louisiana (type host and locality); *F. abacura,* Payne's Prairie, Alachua County, Florida; *F. abacura,* Willowood Pond, Jefferson Parish, Louisiana; *F. a. reinwardti,* St. John the Baptist Parish, Louisiana (new locality).

SITE OF INFECTION: Small intestine.

REDESCRIPTION (based on holotype, 1 paratype, and 26 voucher specimens): Body elongate, tapering slightly posteriorly, 1,199–3,188 (2,114 ± 497; n = 27) long by 123–520 (328 ± 79; n = 28) wide, greatest width at level of acetabulum. Spines present on anterior half of body excluding ventral surface of oral sucker (Figs. 1, 2), densely arranged on tegument from anterior extremity of body to anterior margin of acetabulum (Figs. 3, 4), more sparsely arranged from anterior margin of acetabulum to anterior margin of ovary. Oral sucker subterminal, with oral aperture and 1 pair of lateral muscular papillae; oral sucker measurements excluding papillae: 153–268 (199 ± 33; n = 27) long by 170–280 (216 ± 28; n = 27) wide. Papillae rounded distally, 28–73 (49 ± 11; n = 27; *n* = 54) long by 43–110 (75 ± 15; n = 27; *n* = 54) wide. Acetabulum 103–188 (144 ± 25; n = 27) long by 113–199 (151 ± 24; n = 27) wide. Oral sucker to acetabulum width ratio 1.1:1–1.8:1 (1.5:1 ± 0.18; n = 26). Forebody 430–990 (588 ± 143; n = 26) long; hindbody 769–2,198 (1,518 ± 407; n = 26) long; forebody to hindbody length ratio 0.28:1–0.64:1 (0.4:1 ± 0.09; n = 26).

Short prepharynx present. Pharynx 50–100 (74 ± 12; n = 27) long by 55–110 (84 ± 17; n = 27) wide; often surrounded by numerous, large gland

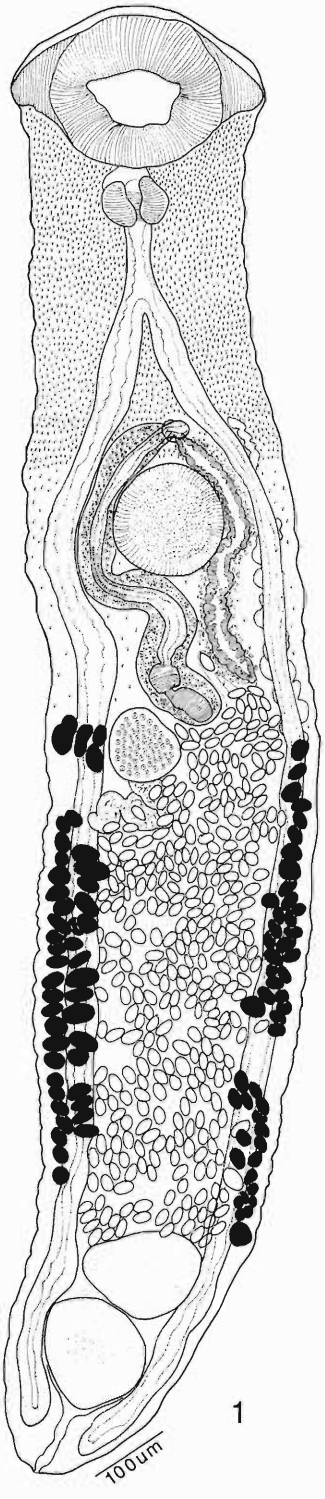


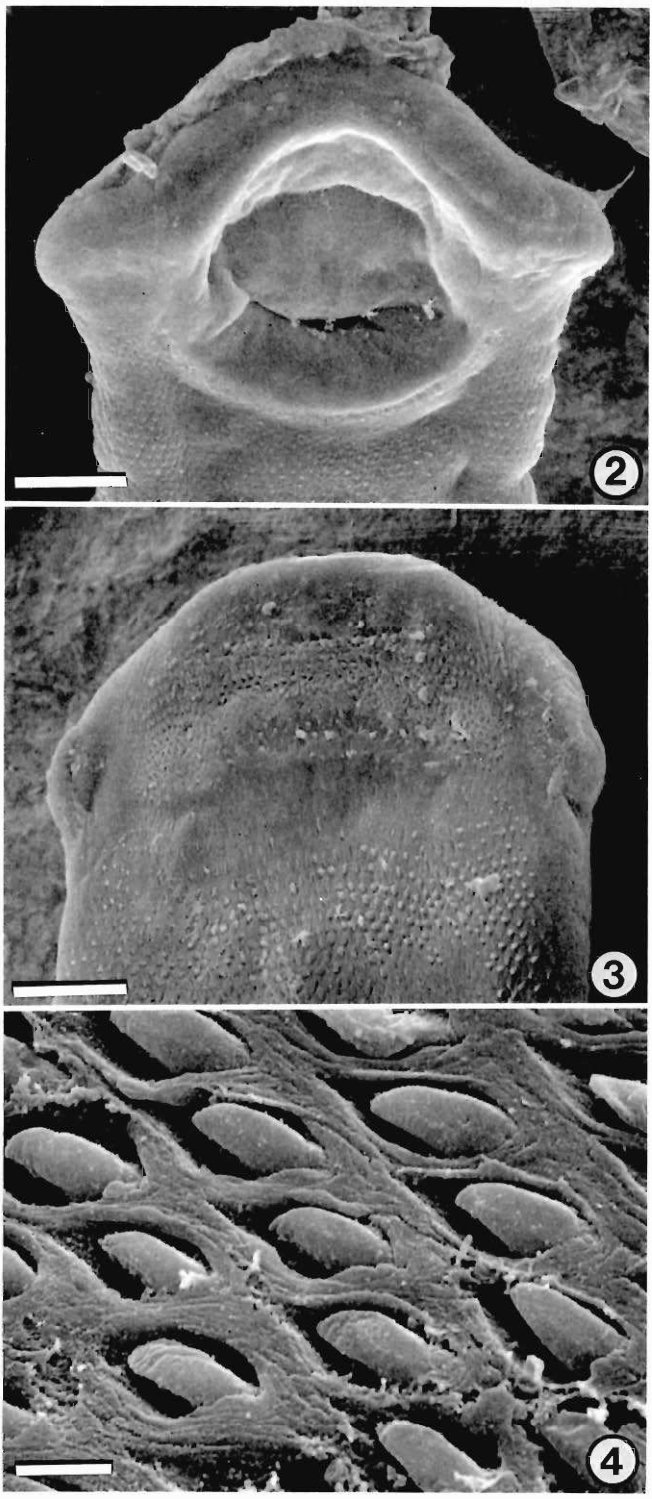
Figure 1. ***Telorchis auridistomi* from *Farancia abacura reinwardti* in Louisiana, ventral view.**

cells. Esophagus 38–188 (85 ± 35; n = 24) long, often surrounded by few gland cells; cecal bifurcation midway between oral sucker and acetabulum; ceca extending almost to posterior end of body. Testes contiguous, tandem, round to somewhat irregular in shape, near posterior end of body. Anterior testis 68–255 (131 ± 39; n = 28) long by 88–260 (132 ± 35; n = 28) wide; posterior testes 83–268 (152 ± 35; n = 28) long by 75–235 (126 ± 33; n = 28) wide. Genital pore ventral, median, at anterior margin of acetabulum. Cirrus sac elongate, somewhat convoluted, extending posteriorly to level of ovary, 288–813 (560 ± 147; n = 27) long by 38–150 (73 ± 25; n = 27) wide; containing bipartite seminal vesicle and well-developed cirrus, each surrounded by numerous cells. Ovary round to transversely oval, usually dextral, immediately posterior to or overlapping posterior margin of cirrus sac, 40–160 (87 ± 24; n = 28) long by 50–235 (102 ± 39; n = 28) wide; seminal receptacle elongate, posterior to ovary; Mehlis' gland present; Laurer's canal not seen. Metraterm sinistral, approximately two-thirds as long as cirrus sac, surrounded by many, large gland cells. Vitelline follicles generally lateral, extending from anterior margin of ovary posterior to anterior margin of anterior testis. Eggs 50–1,190 (292 ± 249; n = 20) in number, 25–35 (30 ± 5; n = 28; *n* = 132) long by 15–20 (17 ± 2; n = 28; *n* = 132) wide, operculate. Uterus with coiled descending and ascending loops. Excretory pore terminal; excretory bladder median, long, giving rise to cornua at about level of ovary; cornua ending posterior to acetabulum.

Discussion

Observation of a large number of newly collected voucher specimens of *T. auridistomi* as well as the type material allowed us to extend the ranges of the measurements for all of the morphometric features of this species as described by Byrd (1937) and MacDonald and Brooks (1989). In addition, the tegumental spines require some comment. Byrd (1937, p. 359) described *C. auridistomi* to possess "cuticula beset with fine spines anteriorly to about the level of the ovary." The tegumental spines of *T. auridistomi* were not described by MacDonald and Brooks (1989), but minute lateral spines were shown extending to a point midway between the ovary and the testes of the specimens they figured. Our Figure 1 illustrates the typical tegumental spine condition in *T. auridistomi*. The spines are conspicuously more dense in the region between the oral sucker and the anterior margin of the acetabulum. We did not find tegumental spines posterior to the ovary in any of the specimens we examined.

There is current disagreement in the literature regarding the number of papillae associated with the oral sucker of *T. auridistomi*. In the original description of this species Byrd (1937) described and figured 2 anterolateral liplike appendages on the oral sucker, but this is inconsistent with the diagnosis of *Auritelorchis*, a genus erected by Stunkard (1979) to contain this and 2 other papillose telorchid species, in which the oral sucker is described as having 2 pairs of papillae (1 dorsal and 1 ventral). It is also inconsistent with the most recent treatment of this species (see MacDonald and Brooks, 1989) in which the oral sucker is described as having both a pair of ventrolateral and a pair of dorsolateral lappets. This species has undergone several generic transfers throughout its taxonomic history and the discrepancy seems to have arisen as a result of 1 of these transfers. Wharton (1940) transferred this species to the genus *Telorchis* and mentioned that the oral sucker had lappets but did not discuss the number. Stunkard and Franz (1977) later proposed that the homogeneity of the unwieldy family Telorchiidae Stunkard, 1924 could be improved by removing the species with ear-like expansions of the oral sucker from the genus *Telorchis*. They therefore erected the genus *Paratelorchis* for 2 species previously assigned to *Telorchis* (*Telorchis auridistomi* and *Telorchis bifurcus* (Braun, 1900) Braun, 1901) and their new species, *P. dollfusi* Stunkard and Franz, 1977, all of which they said (Stunkard and Franz, 1977, p. 383) possessed "dorsal and ventral ear-like lobes on the anteriolateral faces of the sucker." Thus it would appear that Stunkard and Franz believed that these species possessed a total of 4 papillae on the oral sucker (1 pair on the dorsal anteriolateral faces of the sucker and 1 pair on the ventral anteriolateral faces of the sucker). There is no indication that Stunkard and Franz (1977) examined specimens of either *P. bifurcus* or *P. auridistomi* to confirm the presence of 4, rather than 2, oral sucker papillae in these species when they proposed the genus *Paratelorchis*. It now seems that they erred about the configuration of the papillae in these species when they included them under their proposed generic description for *Paratelorchis*. This error was sub-



Figures 2–4. Scanning electron micrographs of *Telorchis auridistomi*. 2. Ventral view of oral sucker. Note presence of lateral papillae. Scale bar = 50 μm. 3. Dorsal view of anterior extremity. Note absence of dorsal papillae. Scale bar = 50 μm. 4. Enlarged view of tegumental spines. Scale bar = 4 μm.

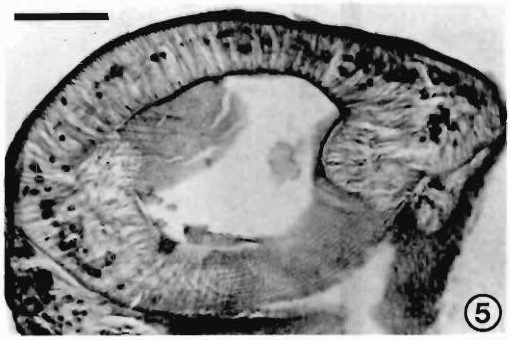


Figure 5. Frontal section through oral sucker of *Telorchis auridistomi* showing musculature of 1 papilla. Scale bar = 50 μm.

sequently repeated by Stunkard (1979) and MacDonald and Brooks (1989).

To resolve the issue of number of oral sucker papillae in *Telorchis auridistomi,* we investigated the oral sucker papillae of this species in detail. Examination of the holotype and the paratype revealed only a single pair of papillae, 1 papilla on each of the ventrolateral surfaces of the oral sucker. Examination of 3 voucher specimens with scanning electron microscopy confirmed the presence of a single pair of papillae on the ventrolateral margins of the oral sucker (Fig. 2), and verified the total absence of papillae on the dorsal surfaces of the sucker (Fig. 3). Sections through the oral sucker showed that these papillae are extensions of the musculature of the oral sucker proper (Fig. 5) similar to those of the papillose allocreadiids (see Caira, 1989). We have therefore chosen to use the term papillae rather than lappet. Three of the 28 specimens we examined (2 of which were from material examined by MacDonald and Brooks [1989]) had enlargements of the oral sucker musculature that might be mistaken for a second pair of papillae; however, we believe these are artifacts associated with contraction of the oral sucker.

Our work requires a change in the key to the species of North American Telorchiidae presented by MacDonald and Brooks (1989). In their key, the feature used to distinguish *T. auridistomi* from *T. dollfusi* is the number of pairs of oral sucker papillae (1 versus 2). As it now seems clear that both species possess only a single pair of papillae on the oral sucker, some other feature must be used to distinguish between the two species. We suggest that the following couplet replace couplet 6 in the key of MacDonald and Brooks (1989, p. 2314):

"6a. Vitellaria extending posteriorly to level of testes; acetabulum distinctly smaller than oral sucker ..... *Telorchis auridistomi*

b. Vitellaria extending posteriorly ½ to ¾ distance from ovary to testes; acetabulum equal to or only slightly smaller than oral sucker ..... *Telorchis dollfusi.*"

Acknowledgments

We thank Dr. J. Ralph Lichtenfels, curator, United States National Museum Helminthological Collection, USDA, Agricultural Research Service, Beltsville, Maryland, and Professor Mary H. Pritchard, curator, Harold W. Manter Laboratory, Lincoln, Nebraska, for assisting us to locate Byrd's specimens of *C. auridistomi,* as well as for lending specimens. We are grateful to Dr. Ward Wheeler, curator of Invertebrates, American Museum of Natural History, New York for arranging the loan of the material of *P. dollfusi.* We are grateful to 2 anonymous reviewers for their very helpful comments on an earlier version of this manuscript. This work was supported in part by operating grant no. BRS-9007613 from the National Science Foundation to J.N.C.

Literature Cited

Brooks, D. R. 1979. New records for amphibian and reptile trematodes. Proceedings of the Helminthological Society of Washington 46:286–289.

Byrd, E. E. 1937. The trematode parasites from a red-bellied watersnake, *Farancia abacura.* Parasitology 29:359–364.

Caira, J. N. 1989. A revision of the North American papillose Allocreadiidae (Digenea) with independent cladistic analyses of larval and adult forms. Bulletin of the University of Nebraska State Museum 11:1–96.

MacDonald, C. A., and D. R. Brooks. 1989. Revision and phylogenetic analysis of the North American species of *Telorchis* Luehe, 1899 (Cercomeria: Trematoda: Digenea: Telorchiidae). Canadian Journal of Zoology 67:2301–2320.

Stunkard, H. W. 1979. *Auritelorchis* nom. nov. for *Paratelorchis* Stunkard & Franz, 1977, preoccupied. Transactions of the American Microscopical Society 98:142.

———, **and R. Franz.** 1977. *Paratelorchis dollfusi* n. g., n. sp., a digenetic trematode from the striped swamp-snake, *Regina alleni*: systematic and taxonomic considerations. Transactions of the American Microscopical Society 96:383–389.

Wharton, G. W. 1940. The genera *Telorchis, Protenes* and *Auridistomum* (Trematoda: Reniferidae). Parasitology 26:497–518.